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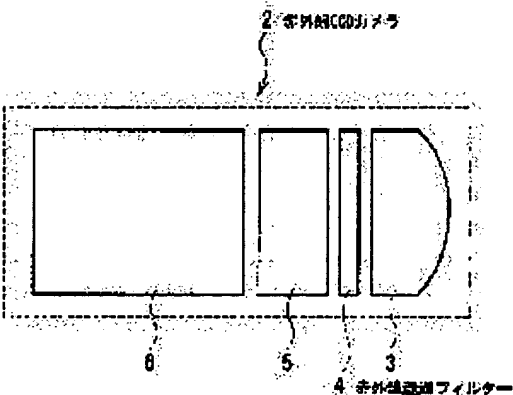
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(22)Date of filing : 29.09.1999 (72)Inventor : HARA HIROSHI

(54) VEHICLE REAR MONITOR

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a vehicle rear monitor which has only one image pickup device, is capable of obtaining images with the same image quality throughout day and night, and which is not affected by a sudden change in brightness.

SOLUTION: The rear area irradiated by an infrared irradiator is image-picked-up by a CCD camera 2 day and night, therefore almost the same image quality can be achieved day or night. Visible light is cut by an infrared transparent filter 4, therefore no halation is generated even if a sudden change in brightness occurs. Use of only one CCD camera 2 as a television camera can eliminate troublesome output balancing adjustment and switching control.



LEGAL STATUS

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CLAIMS

[Claim(s)]

[Claim 1] The car back supervisory equipment characterized by to install the infrared transparency filter which is car back supervisory equipment equipped with the image pick-up equipment which photos the back field of a car, the infrared exposure machine which irradiate infrared radiation to the back field which photos with image pick-up equipment, and the television monitor which display the image photoed with image pick-up equipment, cuts the light into a before [the solid state image pickup device of said image pick-up equipment] side, and penetrates infrared radiation, and to display only the image by infrared radiation.

[Claim 2] Car back supervisory equipment which is car back supervisory equipment according to claim 1, and is characterized by installing the infrared transparency filter between a solid state image pickup device and lenses or in a just before [a lens] location.

[Claim 3] Car back supervisory equipment characterized by being car back supervisory equipment according to claim 1 or 2, and an infrared exposure machine being the structure which installed two or more infrared radiation LED so that a back field could be secured.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the car back supervisory equipment for checking existence of a back obstruction etc. at the time of car retreat.

[0002]

[Description of the Prior Art] Conventionally, when a car backs, the image which photoed the back field of a car with the television camera installed above the car back, and was photoed with the television camera is displayed on a television monitor in the car, and the car back supervisory equipment which checks whether an obstruction etc. exists in car back is proposed (refer to JP,10-255019,A as a similar technique).

[0003] And in order to raise the back check nature in night as this kind of car back supervisory equipment, an infrared camera is also carried besides a light camera, and day ranges photo a back field with a light camera, and he is trying to photo a back field with an infrared camera at night. Moreover, in not using an infrared camera, the light of the dedication which irradiates back etc. is installed and it is carrying out field-of-view reservation at night.

[0004]

[Problem(s) to be Solved by the Invention] However, if it is in such a technique, since two kinds of cameras, a light camera and an infrared camera, must be carried, adjustment of the output balance of those cameras and switch control of a camera are complicated.

[0005] Moreover, in day ranges and night, since the image quality of the image displayed on a television monitor differs, a user senses sense of incongruity.

[0006] Furthermore, although change of the brightness in a light field was processed by the ALC circuit, the AGC circuit, etc. when a photograph was taken with a light camera, there is a limitation also in a throughput and halation had arisen by the saturation phenomenon by the excess of an input, and rapid change of brightness.

[0007] It is made paying attention to such a Prior art, and a television camera can be managed with one, ****, it does not ask, but the image of the same image quality is obtained, and this invention offers the car back supervisory equipment which is not influenced by rapid brightness of change.

[0008]

[Means for Solving the Problem] Invention according to claim 1 is car back supervisory equipment equipped with the image pick-up equipment which photos the back field of a car, the infrared exposure machine which irradiate infrared radiation to the back field photoed with image pick-up equipment, and the television monitor which display the image photoed with image pick-up equipment, installs the infrared transparency filter which cuts the light into a before [the solid state image pickup device of said image pick-up equipment] side, and penetrates infrared radiation, and displays only the image by infrared radiation.

[0009] According to invention according to claim 1, since the back field irradiated with the infrared exposure vessel is photoed with image pick-up equipment, it does not ask **** but the image of the same image quality is obtained also in day ranges and the night. Since the light is cut with an infrared transparency filter, even if a rapid change of brightness arises, it is uninfluent. As a television camera, since one image pick-up equipment is only used, adjustment of troublesome output balance and switch control become unnecessary. In addition, since infrared radiation is not visible to human being's eyes even if it irradiates infrared radiation from an infrared exposure machine, people's eyes are not dazzled.

[0010] As for invention according to claim 2, the infrared transparency filter is installed between a solid state image pickup device and lenses or in a just before [a lens] location.

[0011] According to invention according to claim 2, since the infrared transparency filter is installed between a solid

state image pickup device and lenses or in a just before [a lens] location, all the light that is going to enter into image pick-up equipment will pass along an infrared transparency filter. Therefore, any lights other than infrared radiation are not photoed with image pick-up equipment, only the image by infrared radiation is photoed, and it can output to a television monitor.

[0012] Invention according to claim 3 is the structure in which the infrared exposure machine installed two or more infrared radiation LED so that a back field could be secured.

[0013] Since an infrared exposure machine is the structure which installed two or more infrared radiation LED so that a back field could be secured according to invention according to claim 3, the need check-by-looking range can be certainly irradiated with image pick-up equipment with this infrared exposure vessel.

[0014]

[Embodiment of the Invention] Hereafter, the suitable operation gestalt of this invention is explained based on drawing 1 - drawing 4 . 1 is a heavy-duty truck as a "car", and CCD camera 2 as "image pick-up equipment" for photoing the back field R of a heavy-duty truck 1 is installed in the back upper part of the pallet in the state of slanting facing down.

[0015] This CCD camera 2 is the structure equipped with the lens 3, the infrared transparency filter 4, the solid state image pickup device (CCD) 5, and the actuation circuit 6 from the front face, as shown in drawing 3 . In addition, the infrared transparency filter 4 should just have the light which is going to enter into CCD camera 2 in "a before the location 5 along which it surely passes, i.e., a solid state image pickup device, side." Therefore, the location of the infrared transparency filter 4 may be changed into a just before [a lens 3] location.

[0016] Since such an infrared transparency filter 4 is formed, the lights other than infrared radiation are cut and only the image by infrared radiation is photoed in the solid state image pickup device 5 of CCD camera 2. The video signal of this CCD camera 2 is transmitted to the television monitor 8 arranged by the instrument panel 7 ahead of the driver's seat of a heavy-duty truck 1, and an image is displayed on that television monitor 8.

[0017] Moreover, the infrared exposure machine 9 is installed in the adjoining location of CCD camera 2. As shown in drawing 4 , this infrared exposure machine 9 is the structure which installed two or more infrared radiation LED 10 so that a back field could be secured, and can irradiate infrared radiation now to the back field R of a car. While the infrared exposure machine 9 is operating, the infrared exposure from this infrared exposure machine 9 does not ask day ranges and night, but is always performed. And people's eyes are not dazzled even if it irradiates the Ushiro sense from the back of a heavy-duty truck 1, since the infrared radiation itself irradiated from the infrared exposure machine 9 is not visible to human being's eyes.

[0018] As mentioned above, since the back field R irradiated with the infrared exposure vessel 9 is photoed with CCD camera 2, it does not ask **** but the image of the same image quality is obtained also in day ranges and the night. And in order to photo the back field R only using the infrared radiation irradiated from the infrared exposure machine 9 not using the light, halation will not be caused even if a rapid change of brightness arises. That is, it is not influenced by external brightness of change.

[0019] Moreover, as a television camera, since one CCD camera 2 is only used, adjustment of troublesome output balance like [at the time of using two television cameras, the object for the lights and the object for infrared radiation, like before] and switch control become unnecessary.

[0020]

[Effect of the Invention] Since the car back supervisory equipment concerning this invention is the thing which was explained above and which came, image pick-up equipment can be managed with one, it does not ask ****, but the same image is obtained, and it is not influenced by rapid brightness of change.

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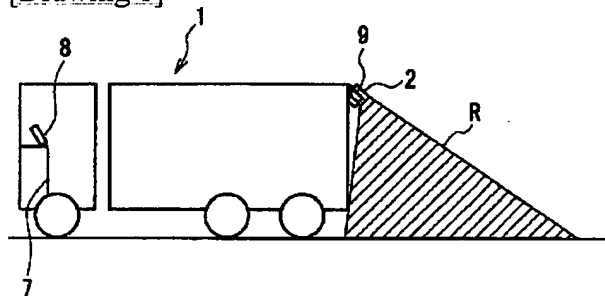
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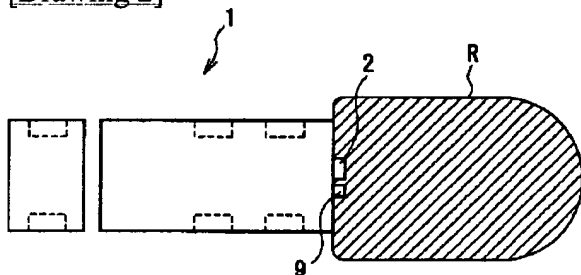
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DRAWINGS

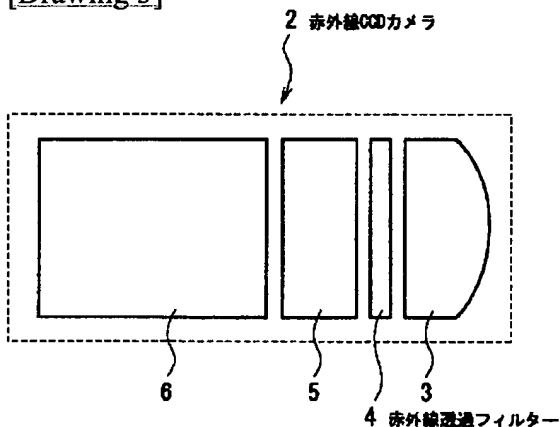
[Drawing 1]



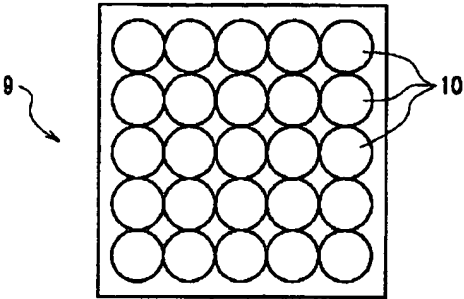
[Drawing 2]



[Drawing 3]



[Drawing 4]



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